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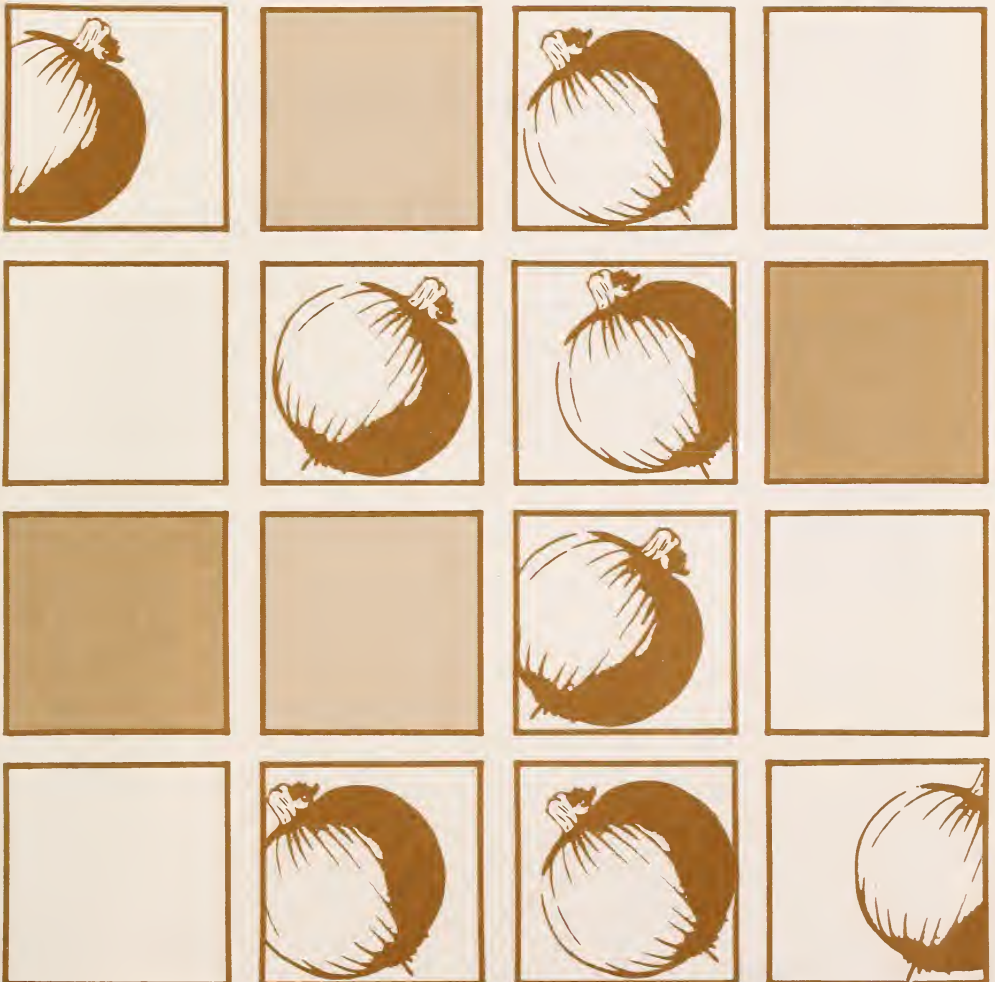
/ Onions are Marketed

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U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
MARKETING BULLETIN NO. 65

PROCUREMENT SECTION
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How Onions are Marketed

By W. D. Paterson, Economist, Fruit and Vegetable Division, Agricultural Marketing Service

INTRODUCTION

The onion is one of the oldest known vegetables. Although it probably originated in the Far East, it was a dietary staple in ancient Egypt and other Mediterranean countries. Spanish explorers introduced onions into the Western Hemisphere where they were grown by early colonists and soon after by native Indians.

Average per capita use of dry or cured onions is about 13 pounds each year, including fresh, dehydrated, canned, and frozen forms. Cured onions are distinguished from green onions, which are those marketed in the immature stage with the tops attached to the bulb. Onions are low in calories and a good source of minerals and vitamins. They are used mostly for flavor, but many people like onions as separate plate vegetables or mixed with other foods. Annual production typically is close to 3.3 billion pounds. Average farm value is \$237 million.

SUPPLIES, PRICES, AND FOREIGN TRADE

U.S. production

Onions are grown in each of the 50 States, but commercial production is concentrated in a few. They require fertile soil and proper temperature and moisture. Best growth occurs with an extended period of cool temperatures before bulb formation begins; warm temperatures during bulbing, harvest, and curing; and low humidity during curing.

California, the leading producer, grows 30 percent of the annual crop. Texas, with 16 percent, is the second largest producer, and Oregon and New York follow with 12 and 11 percent, respectively. Eleven other States produce the remaining third of the annual tonnage (table 1).

Table 1. Onions: Commercial production by States and percentage of total, 1975-77 average

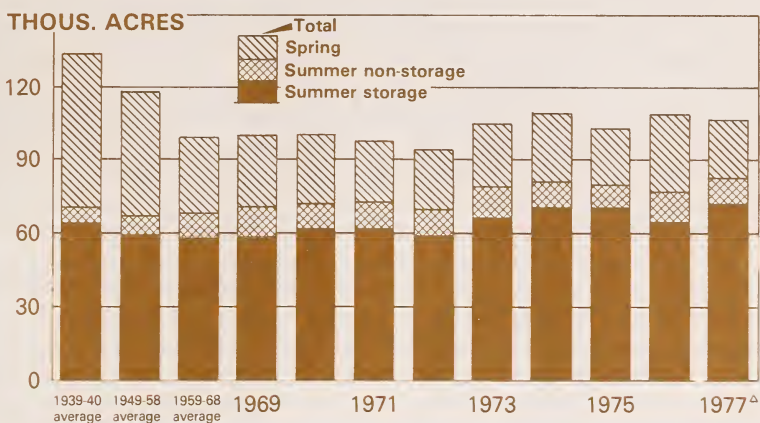
State	Average production 1975-77	Percentage of total
	<i>Mil. cwt.</i>	<i>Percent</i>
California	9.8	29.5
Texas	5.2	15.7
Oregon	4.0	12.2
New York	3.7	11.0
Idaho	2.5	7.4
Michigan	2.0	6.1
Colorado	2.0	5.9
New Mexico	1.1	3.4
Washington	1.0	2.9
Arizona	.7	2.0
Utah	.4	1.3
Wisconsin	.3	1.0
Minnesota	.2	.6
Ohio	.2	.6
New Jersey	.1	.3
United States	33.2	100.0

Note: Data do not add to totals due to rounding.

For many years onion production has been increasing at approximately the same rate as population growth — enough to maintain per capita consumption at a steady level. In 1939, growers harvested 136,000 acres, producing a crop of 1.8 billion pounds. Production was up 78 percent to an average 3.3 billion pounds in 1975-77. Recent average crops were grown on 110,000 acres, and had a farm value of \$237 million.

The larger production is being reached with fewer farms. The

U.S. DRY ONION ACREAGE*



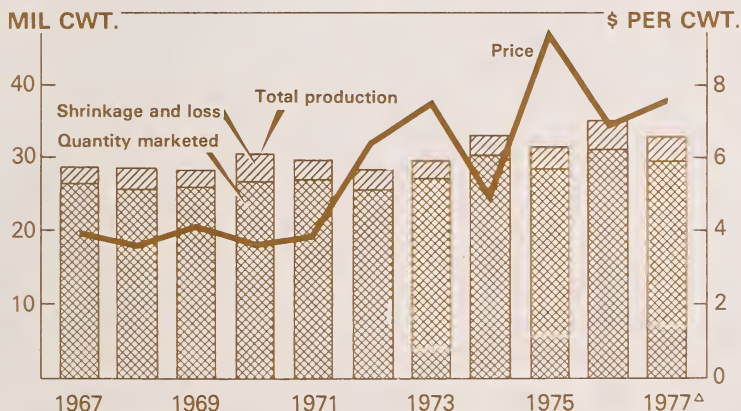
Source: Economics, Statistics, & Cooperatives Service.

USDA

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Figure 1

DRY ONIONS FOR FRESH MARKET AND PROCESSING U.S. Production, Quantities Marketed, and Price*



* Prices based on quantities marketed. Fresh market price basis f.o.b. shipping point; quantities sold for processing valued at packinghouse door. ^Δ Preliminary.

Source: Economics, Statistics, & Cooperatives Service, USDA.

USDA

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Figure 2

1939 census reported about 29,000 farms growing onions. By 1947 the number had dropped to 16,000, and by 1975 there were only about 5,000 commercial growers.

Recently, most of the increase in onion production has occurred in two areas — California and the Idaho-eastern Oregon area. The expansion in California is related to the increasing importance of dehydration as an outlet for onions. Idaho-eastern Oregon's growth is partly a reflection of the region's high yields, which are typically at least 50 percent above the U.S. average. This gives producers an economic advantage over other areas where yields are lower.

For commercial purposes onions are classified by type and color. The principal types are globes, Spanish, and grano-granex. Globe-type onions are round to oval in shape, medium size (2 to 3 inches in diameter), and firm to hard to the touch. Globes are the dominant type grown in the Midwest and East; they are not adaptable to Southern States. They tend to have a strong flavor and keep well under proper storage conditions until early spring. Most globe-type onions have a yellow skin, but there also are several important globe varieties with red or white skin.



Figure 3. Nearly mature Sweet Spanish onions

Spanish-type onions, originally introduced from Spain, were noted for their mild, sweet flavor but poor storage ability. Varieties have been developed which can be stored until midwinter and are more pungent though still milder than the globe types. Spanish onions are medium to large in size and round to oval in shape. They are particularly well adapted to production under irrigation in Western States. Most have yellow skins although a few white Spanish onions are grown commercially.

Grano and granex onions are mainly yellow, mild, and medium to large. They are the most important types produced in the southern and southwestern areas for early spring and summer harvest.

Seasonal availability

Onions are available all year, and distribution to market is relatively steady on a monthly basis. Harvest of the annual crop begins in late winter in the Lower Valley of Texas, where volume hits a seasonal peak in April. Additional supplies are available from the Southwestern States in May. Harvest activity moves north seasonally and generally is active in the Northern States by midsummer.

The earlier harvested crops, tender and perishable, must be marketed within a few days to avoid spoilage. Onions harvested during the late summer are less susceptible to damage; a substantial portion of this crop is stored for later sale during the fall and winter months. Movement out of storage overlaps with harvest of the Texas crop the following spring.

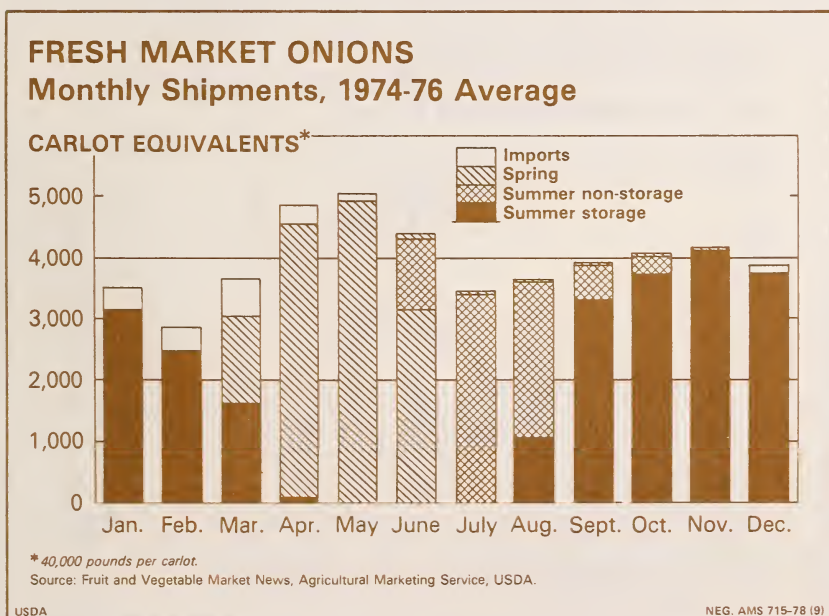


Figure 4

Consumption

Raw onions contain about 172 calories per pound and when cooked, 132. They also contain minerals, including calcium, phosphorus, and iron, as well as vitamins A and C, thiamin, riboflavin, and niacin. Onions are used principally for flavor but also are served as an individual dish or in combination with other foods. Their unique flavor and relatively low cost contribute to stability in consumption. Annual U.S. per capita consumption of onions has held within a 11-13 pound range for several decades.

Consumers buy most of their onions raw; 10.3 of a total 12.9 pounds per capita were bought raw in 1976. Dehydrated onions accounted for 2.2 pounds. A major portion of the dehydrated onions are used by other food processors. Frozen onion purchases, mostly as french fried onion rings, amounted to slightly less than half a pound per person in 1976. Although pack or consumption data are not available, purchases of canned or pickled onions are believed to be even smaller.

Prices

Prices to growers for onions are reported by the U.S. Department of Agriculture's Economics, Statistics and Cooperatives Service (ESCS) on a basis of "f.o.b. (free on board) shipping point." Prices at this level were relatively stable through 1971 but moved up sharply thereafter — from 4.1 cents per pound in 1969-71 to 8.2 cents in 1974-76. The increase was a result of rising production and marketing costs. Detailed price data for Texas onions show that it required about 3.2 cents to produce, harvest,

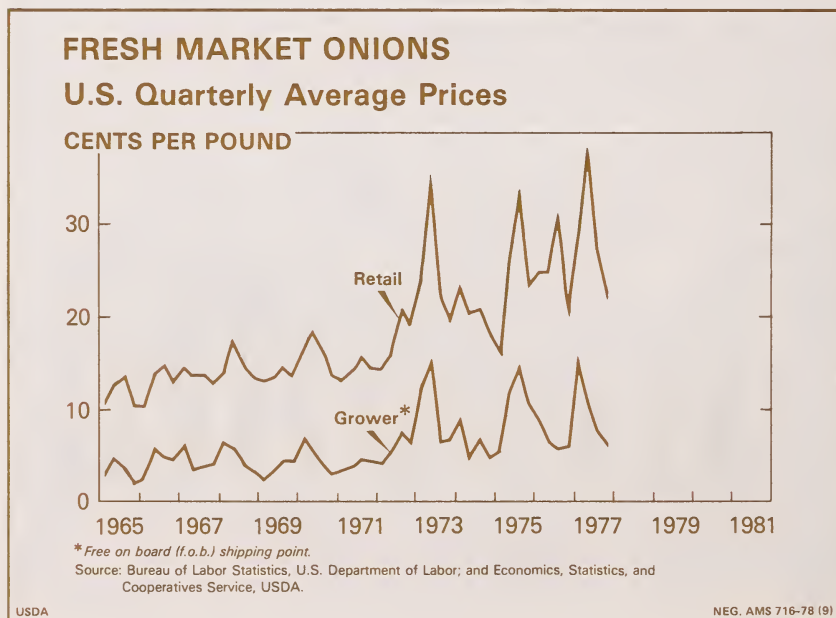


Figure 5

and prepare a pound of onions for market in the late 1960's and 5.6 cents for the more efficient operators to perform the same functions in 1976.

In retail grocery stores, onions are offered for sale loose in bulk, or prepackaged in film or net bags commonly containing 3 pounds each. Both loose and bagged onions are priced on a per pound basis with different prices charged for different varieties. Retail prices averaged nearly 23 cents per pound in 1974-76.

In wholesale trading, size is also an important pricing factor. Generally, for all varieties, larger onions sell at a premium over medium-size onions. However, the premiums decline significantly when total onion supplies are large.

Since demand for onions is highly inelastic, prices vary greatly with changes in supply. Year-to-year changes in f.o.b. prices during the past decade ranged from 5 to 92 percent, and averaged 30 percent.

Foreign trade

U.S. trade in onions is small in total, but relatively important in some States and during certain times of the year. Over the past decade, exports usually ranged between 1 and 2 million hundredweight. However, exports were a record 2.6 million hundredweight in 1976-77, when large quantities moved to western Europe where drought had caused short local crops.

Canada is the leading customer; U.S. onions move to that country every month with a seasonal peak each spring. Japan recently has been second in importance as an outlet, purchasing storage onions, mostly from Oregon and Idaho. U.S. exports to western

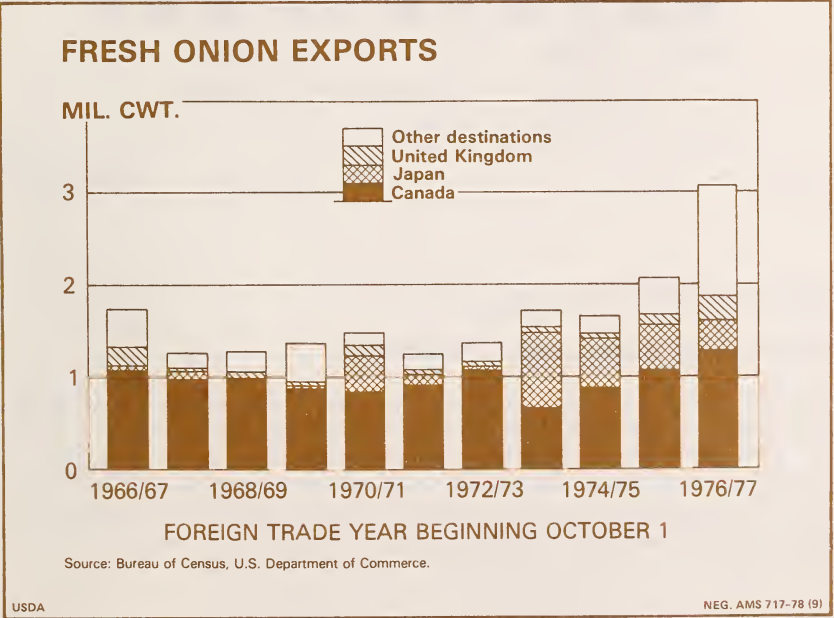


Figure 6

Europe begin with storage onions in late fall and peak with new-crop onions from Texas in the spring.

Imported onions typically amount to less than 1 million hundredweight annually, and furnish about 3 percent of the U.S. market supply. Imports supplement total supplies, rising significantly only when U.S. output is affected by weather.

Although some onions are imported every month, imports are largest during the winter. Mexico is the most important source, accounting for about 90 percent of total imports. Volume is heaviest in late winter and composed primarily of white onions. Significant amounts of distinctive varieties of red onions are imported from Italy, mostly for sale in New York City.

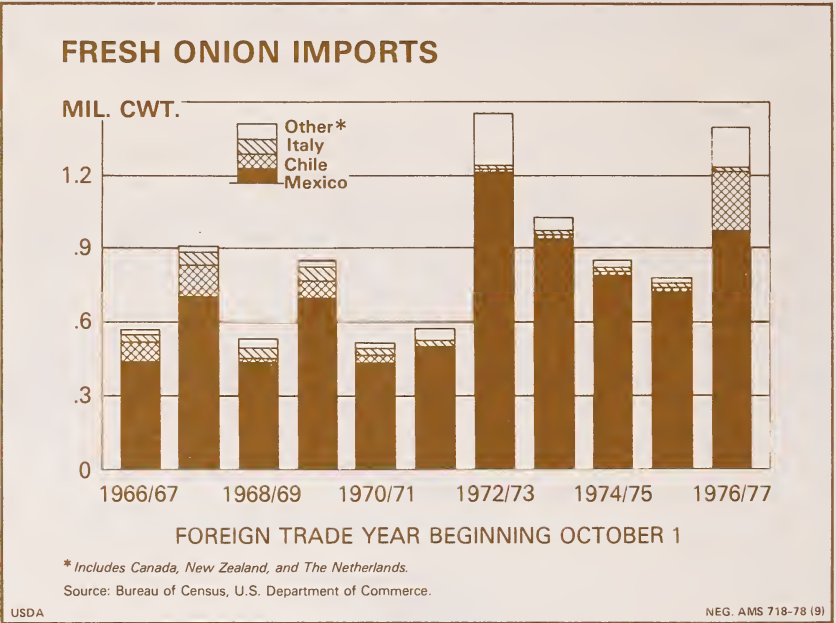


Figure 7

MARKETING PRACTICES

Harvesting and market practices

Onion fields are harvested when most of the crop has reached the mature stage and bulb growth has ceased. Maturity is indicated when the onion tops turn yellow and collapse. In the harvest operation, the onion tops and roots are removed in the field. Onions then undergo a curing process during which the surface tissues dry and seal out organisms which could cause decay.



Figure 8. View of Sweet Spanish onion field showing extensive top growth necessary for bulb formation.

Harvesting and handling methods vary among production areas, depending on climate and type of onion grown, and whether the onion is to be used for fresh market or processing. Although in some areas onions are still pulled, topped, and placed in bags or field crates by hand, the trend is toward a mechanized operation.

Almost all of the storage onion crops in New York and Michigan, as well as the crops in California grown for dehydration, are machine harvested. In most early crop areas, however, hand harvesting is still common because the onions are more susceptible to bruising. A large share of the storage-crop onions grown in Idaho-eastern Oregon and Colorado are also pulled and topped by hand. Although less subject to damage than the early season varieties, the onions grown in these States are relatively soft Spanish types and are not as well suited to machine harvesting as the globe types grown in the East and Midwest.

In an early crop area such as south Texas, harvest typically begins by lifting the onions out of the ground with a tractor-drawn machine. This stops growth, and the onions begin to cure. After several days of curing, the roots and tops are clipped off with hand shears, and the onions are placed in field bags. A few days later the onions are transported to packing sheds for final drying, which is done by forced hot air. After drying, the onions are moved over a system of conveyer belts, rollers, and screens to remove dirt and to complete the grading and packaging operation. Defective onions are removed by hand, but sizing and bagging is done by machine.



Figure 9. Bagged onions being hand loaded on truck for transportation to packing shed or storage.



Figure 10. Mechanical loading of topped and field-cured onions for transportation to warehouse.

In a fully mechanized harvest, machines undercut the onions, lift them out of the ground, and pile them in rows. Other machines pick up the onions, cut off the partially dried tops, and lower the onions into bulk boxes located on a tractor-drawn trailer. The topping machine includes equipment to remove loose dirt from the onions.

In northern onion-growing areas which harvest relatively early, growers commonly leave the boxed onions in the field for drying. In most States, however, drying is done primarily in storage buildings. The onions are stored in 50-pound bags, crates, or large bulk containers and arranged to allow adequate circulation of air for keeping the onions in good condition.

Onions are generally graded according to U.S. grade standards, which involve characteristics of maturity, firmness, and shape as well as freedom from such defects as decay, sunscald, and mechanical damage. Each U.S. grade category (U.S. No. 1, No. 2, etc.) specifies a minimum size. U.S. No. 1 grade yellow globe onions must be at least 1.5 inches in diameter, with at least 40 percent 2 inches or larger. The industry practice is to pack to a size well above the minimum required. In New York, 60-70 percent of the onions in the more common pack are 2 inches or larger in diameter. In Michigan, 70 percent of a typical lot meet a 2-inch minimum.

The graded and sized onions are packed by machine in various containers — usually bags made of plastic or woven material. The 50-pound bag is the most popular container, although 3- to 5-pound-capacity bags also are used in most packinghouses. Cartons holding about 50 pounds of onions are being used more frequently in several areas.

MARKETING CHANNELS

Distribution from farm to retail is basically the same for both the fall storage crop of onions and the perishable spring and summer crops. Most onions are transported by truck; in 1976 about 85 percent of the total onions unloaded in the leading U.S. terminal markets arrived by truck. However, railroads still are important transporters out of the western producing areas to the big urban centers in the Northeast.

A few growers grade and ship their own onions. Generally, though, grading services are performed by marketing firms which then ship the onions to buyers in the terminal areas. Most shippers also grow a sizable portion of the onions they handle. This way, the marketing firm is assured of enough supplies to operate continually throughout the season. Several firms have production and packing facilities in several areas so they can market onions throughout the year.

A large amount of onions is packaged at terminal markets, either by wholesalers who specialize in providing this service for onions and potatoes or in warehouse and packaging facilities operated by the retail chains. Since quality does not change rapidly, onions are adaptable to prepackaging. A majority are sold at

retail in 3- and 5-pound bags. However, large Spanish-type onions frequently are displayed in bulk.

Virtually all shipping point trading is done by telephone, and transactions are governed by ethics, custom, and trading laws. Grades as determined by the Federal-State Inspection Service identify the quality of each lot and thus facilitate trading. The grade certification also ensures against unwarranted claims about the quality and condition of the merchandise.

Federal-State Market News Service reports are widely used by the industry to evaluate onion supply and demand. Data on shipments, unloads, prices at shipping points and terminal markets, weather conditions, and other information are provided to the industry on a timely schedule. In many growing areas, the information is disseminated rapidly by radio and telephone recordings. Summary materials published daily and seasonally provide benchmarks for trading.

The Federal-State Market News Service is provided by the USDA's Agricultural Marketing Service in cooperation with State agencies, usually the State departments of agriculture. In cooperation with State departments of agriculture or other State agencies and the USDA's Food Safety and Quality Service, nationwide inspection and grading services are available from the Federal-State Inspection Service. Supply estimates are furnished by the Economics, Statistics, and Cooperatives Service, USDA.

STATE INDUSTRIES

California

California is the leading State in the volume of onions produced. It ships fresh onions to market every month of the year, and large quantities go to processing outlets, including dehydrators, canners, and freezers. The State's industry has expanded at a rapid rate, with acreage now more than double that of the early 1950's. Yields also have risen, and average production in 1975-77 was nearly 10 million hundredweight, about three times greater than 1949-51. Increased use of onions for dehydration has accounted for a large share of the growth. Production and sales of California spring and summer fresh onions have fluctuated widely from year to year and show no trend.

Harvest of the annual crop begins in the southern deserts in late April and spreads seasonally northward, ending at the Oregon border during October. Movement to fresh market is heaviest from June through August, when sizable quantities move in interstate commerce. Shipments are relatively light during the winter and go almost exclusively to local markets. However, foreign markets are an important outlet for the Australian Brown onion — a variety which stores well into the winter.

The important processing industry contracts with growers for tonnage to control the quality and quantity of supply. Dehydrators contract for onions in numerous areas of the State to extend the length of time they will have fresh raw onions to process.

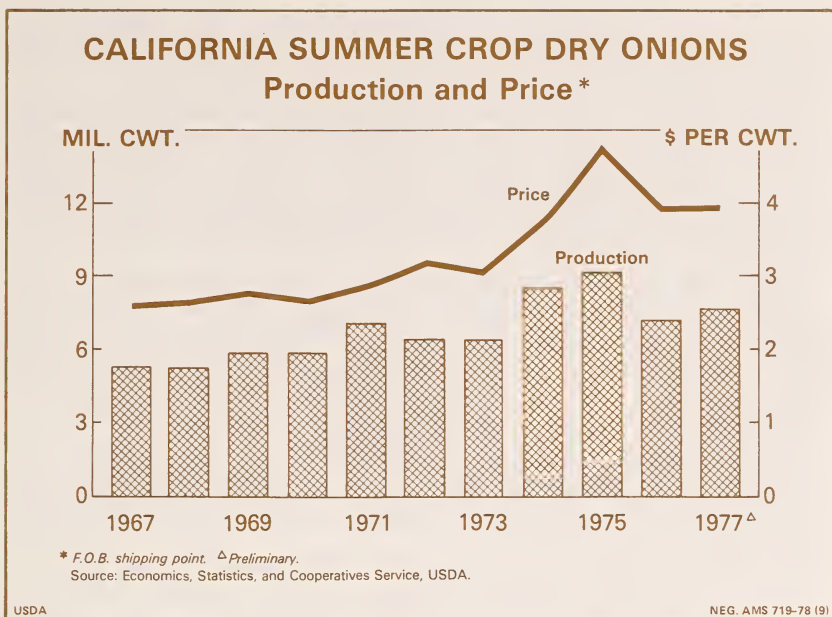


Figure 11

Texas

Texas accounts for about 16 percent of the annual U.S. onion production. An early crop is grown in the southernmost counties and marketed from about mid-March through early May. In recent seasons, however, new heat-tolerant varieties have been introduced in order to extend the active harvest season into June. Later crops originate in the Trans-Pecos area in west-central Texas and in the Panhandle where harvest extends into September.

Direct field seeding of onions is common throughout the south Texas area, with some sets being used for late plantings. Irrigation is used extensively. The crop is subject to a variety of weather hazards — low temperatures during the growing season, and sometimes excessive rain, which is a disadvantage both at planting time and harvest. As a result, production is highly variable from year to year.

Although south Texas is by far the dominant source for U.S. dry onions during April, supplies available from other sources have an important effect on the State's market. During the early part of the south Texas season, stored onions from the previous year's crop in northern tier States provide the principal competition. Imports from Mexico and several other countries also frequently are sub-

stantial. As the season progresses there is some overlap from supplies being harvested in other spring-crop States, including California and Arizona.

Shipments of south Texas onions are regulated under a Federal marketing order. Regulations typically include minimum grade and size requirements, specify container sizes, and prohibit packaging and loading of onions on Sunday. Funds collected under the program are used to finance onion production research projects.

Onion planting in the Trans-Pecos and Panhandle areas of Texas extends from early November into late April. Most of the crops in both areas are grown from transplants. Harvesting in the Trans-Pecos area begins in mid-May and continues through June. The Panhandle crop harvest is active from July through August with light supplies available during September.

In recent years production in south Texas has been variable and it has shown no trend. Output in other sections of the State has been well above that in the mid-1960's, mainly because of increasing yields.

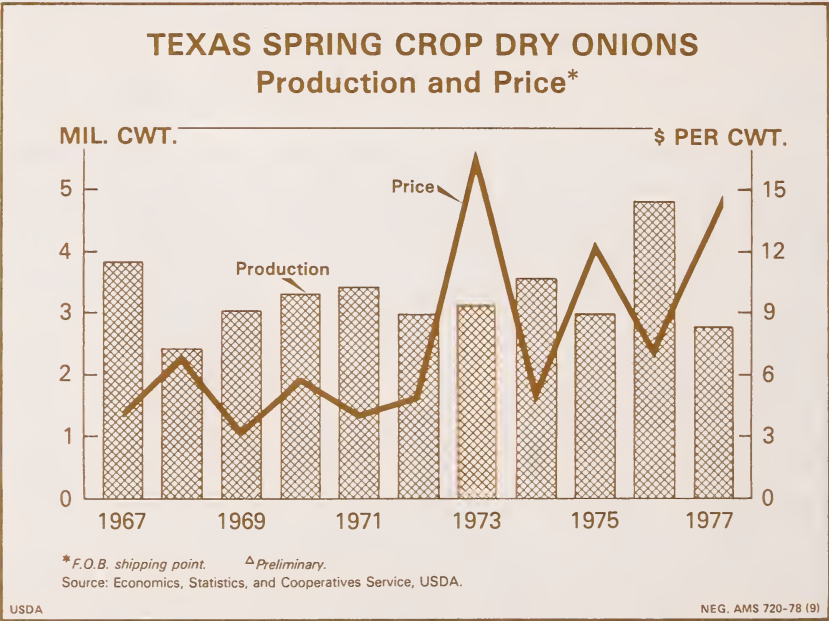


Figure 12

Idaho-Oregon

Some onions are grown in the Twin Falls area of south central Idaho, but most are produced in the southwestern part of the State. The production area extends into Malheur County, Oregon. Together the two areas (Idaho-eastern Oregon) account for about

a third of the U.S. storage-crop onions. The combined Idaho-eastern Oregon area ranks third in terms of U.S. total annual onion production, following California and Texas. During the past decade, Idaho-eastern Oregon onion production increased substantially. Peak output of 6.2 million hundredweight in 1976 compared with about 3.5 million hundredweight in the mid-1960's. The increase was achieved primarily through increased plantings.

The yellow sweet Spanish onion is the predominant variety grown in this area. White types are also grown in commercial volume, accounting for close to 10 percent of total shipments in recent years. Red types represent a small portion of the total. Planting extends from late March through April. Direct seeding by machine has been common in this area for many years, and most of the crop is grown under irrigation.

The area's marketing season extends from July into the following April, but about 75 percent of the shipments usually occur during the September-January period. More than 90 percent are shipped fresh, with the remainder going to local freezers and canners.

A Federal marketing order has been in effect since 1957 for Idaho-eastern Oregon onions. Principal features of the program include authority to regulate grade, size, and pack of containers, a research program to improve production and reduce marketing losses, and a promotion program to advertise the virtues of the area's onions.

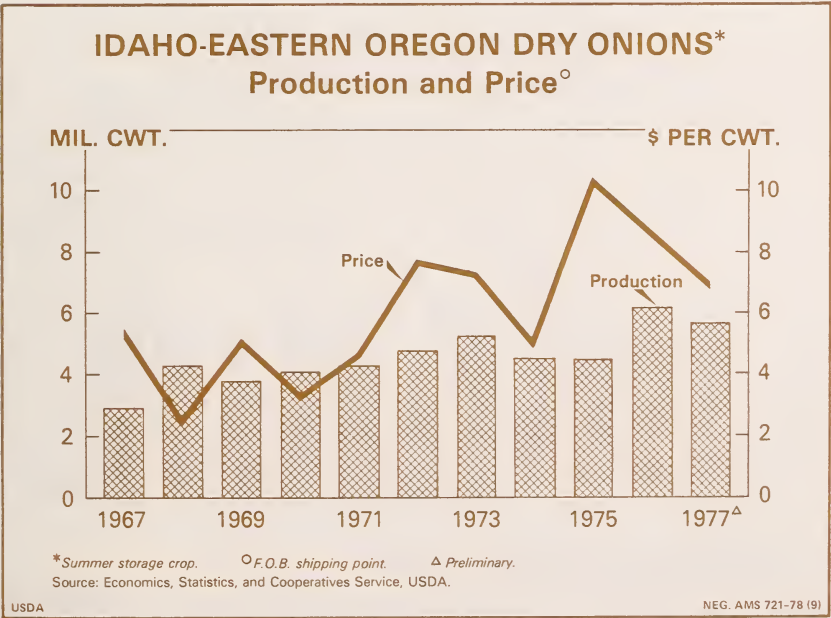


Figure 13

New York

New York accounts for about one-fourth of the U.S. storage crop. A few onions are grown on Long Island, but the more important areas are Orange County, the Elba section of Genesee and Orleans Counties in the western part of the State, and the centrally located Madison and Oswego sections.

Most of the upstate New York onion crop is grown in deep organic deposits commonly referred to as muck soil. Planting begins in late March and extends into May. The yellow globe is the predominant type. Some fields of early varieties usually are ready for harvest in August and September. Planting and harvesting operations are highly mechanized. Nearly all of the crop is marketed fresh, but some onions are processed.

In recent years, New York onion production averaged 3.7 million hundredweight — 15 percent less than the 4.4 million average in the mid-1960's. Adverse weather in several years was mainly responsible for this decline. Average shipping point prices for New York onions trended higher in the early 1970's. As a result, the 1975-77 average crop value of almost \$34 million compares with \$14 million in 1965-67. New York-grown onions are sold mostly in eastern outlets. Important destinations include New York City, Boston, Philadelphia, Atlanta, and Miami. In recent years, transportation of onions has been primarily by truck.

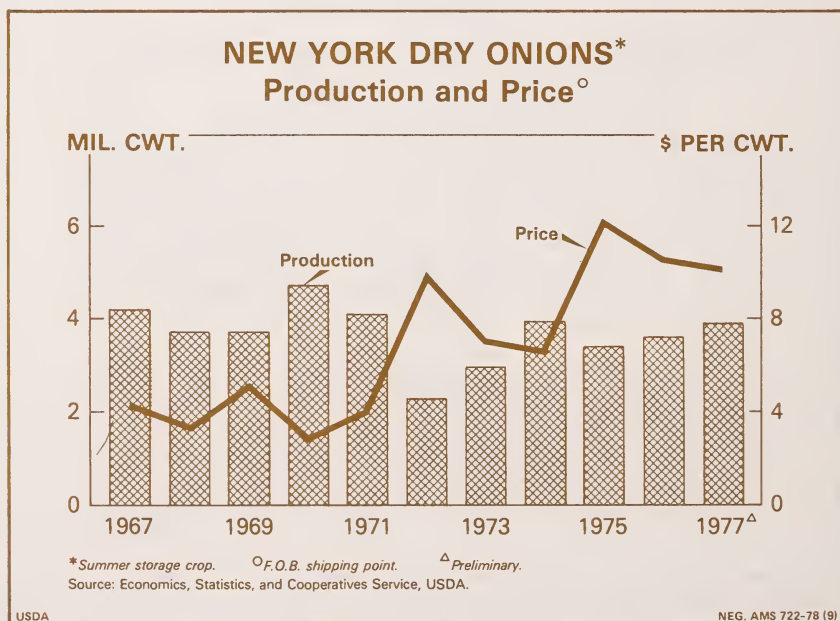


Figure 14

Michigan

Michigan has provided about 13 percent of the storage crop in recent years. The crop is produced in the southern part of the State, mostly on organic muck soils. The yellow globe type accounts for about 90 percent of the acreage. Other types include some white onions and a few reds, although the latter have declined in importance. Practically all of the acreage is direct seeded.

Active marketing of Michigan's onions begins in early September and continues through the fall and winter. The fresh market is the principal outlet; only relatively small quantities are used for canning and freezing. During the 1975-77 marketing seasons, shipments ranged from 1.8 to 2.0 million hundredweight. Slightly more than half of Michigan onions are shipped to midwestern cities, principally Detroit.

Over the past decade there was a downtrend in Michigan onion production. Average production of about 2.0 million hundredweight during 1975-77 was nearly 20 percent less than the 1965-67 average of 2.4 million.

Colorado

Planting of Colorado's onions begins in mid-March and is completed by late April. Harvest gets underway in July with the bulk of the crop harvested in August and September. Shipments from temporary storage facilities in the Arkansas Valley continue into December, and supplies from northern Colorado extend into March. The shipping season for the Western Slope extends into late March.

Yellow sweet Spanish varieties, including numerous hybrids, predominate in Colorado. Small quantities of white onions also are grown. The State is the leader in "pearl" type onion production; these onions are frozen, primarily in combination with green peas. Many growers have shifted to use of mechanical harvesting equipment, and most of the crop is field cured.

In the 1976-77 season, about 1.8 million hundredweight of fresh market onions were shipped from Colorado. About half originated in northern Colorado, with the remainder divided between the Western Slope and the Arkansas Valley. Most are transported by truck with less than 1 percent moved by rail. Colorado's production showed a moderate decline in the late 1960's, but the trend has been reversed. In 1975-77, output averaged 2.0 million hundredweight versus the 1965-69 average of 1.7 million. Contributing to the recent uptrend were additional plantings and higher average yields as growers made use of improved hybrid varieties on land not affected by disease problems.

SUMMARY

Onions rank high in economic importance among commercially grown vegetables. Although seasonal output often ranges widely from year to year, annual output has kept pace with population gains, reflecting the popularity of onions. Per capita consumption is stable at 11 to 13 pounds annually. Due in large part to constant consumer demand for onions, prices are highly sensitive to supply changes.

U.S. onion production usually is adequate for domestic requirements, although on infrequent occasions temporarily short supplies and resultant high prices attract additional quantities from other countries. U.S. imports are mostly types not available in sufficient volume from domestic sources. Foreign markets are important outlets for a few U.S. onion-producing areas.

Onion harvesting and handling methods are related to the varieties and types of onions grown, as well as to how the onions are used. Harvest in some areas is completely mechanized but growers in other areas must rely on hand harvesting methods to avoid excessive bruising of the onions.

Onions are typically sold on the basis of U.S. grade standards, which include specifications for each category and type, such as "U.S. No. 1" or other designations. Growers in two principal onion-producing areas market their crops under Federal marketing order programs. In addition to grade and size regulations for shipments, these two programs include provisions for grower-supported production research. Timely market reports issued by the Federal-State Market News Service are widely used by the produce industry to facilitate onion trading.

BIBLIOGRAPHY

Binkley, A.M., and others

Onion Production in Colorado. Bull. 414-A. Fort Collins, Colo., Colo. Agr. and Mech. College., Colorado Agr. Expt. Sta. - Agr. Ext. Ser., 1951.

Creel, John M., and James A. Harding

Summary of Agronomic and Entomological Research on Onions at the Winter Garden Station. MP-699. College Station, Tex. Texas Agr. Expt. Sta., 1958-1963.

Davis, Glen N.

Onion Production in California. Manual 22. Davis, Calif., Univ. of California, California Agricultural Expt. Sta. - Ext. Service, 1957.

Greig, Smith W., and Lockwood Marine

Onions and Their Processing Potential. Ag. Ec. Mimeo 858. East Lansing, Mich., Michigan State Univ., Ag. Econ. Dept., 1962.

- Isenberg, F.M., and J.K. Ang
Northern Grown Onions, Curing, Storing, and Inhibiting
Sprouting. Ext. Bull. 1116. Ithaca, N.Y., Cornell Univ., New
York State College of Agriculture, 1963.
- Longbrake, Tom, and others
Keys to Profitable Onion Production in Texas. MP-971. Col-
lege Station, Tex., Texas A&M Univ., Agr. Expt. Ser., 1963.
- Mansour, N.S., and others
Commercial Onion Production in Oregon. Ext. Cir. 817. Cor-
vallis, Oreg., Oregon State Univ., 1972.
- Magruder, Roy, and others
Descriptions of Types of Principal American Varieties of On-
ions. Misc. Pub. No. 435. Wash., D.C., U.S. Dept. of Agr.,
1941.
-
- Storage Quality of the Principal American Varieties of
Onions. Cir. No. 618. Wash., D.C., U.S. Dept. of Agr.,
1941.
- Perry, Bruce, and Henry A. Jones
Onion Varieties in Texas. Bull. 854. College Station, Tex.,
Texas Agr. Expt. Sta., 1957.
- Raleigh, G.J.
Onion Production on Muck Soils. Ext. Bull. 674. Ithaca, N.Y.,
Cornell Univ., New York State College of Agriculture,
1959.
- Reichardt, Alan W.
Onions, Irrigated, Texas Rio Grande Valley Region, Estimated
Costs and Returns Per Acre, High Level Management.
Weslaco, Tex., Texas A&M Research and Extension Cen-
ter, 1975.
- Ringel, S.M., and others
Some Quality Changes in Onions During Marketing. AMS-488.
Wash., D.C., U.S. Dept. of Agr., 1962.
- Rosberg, David W., and H.B. Johnson
Artificial Curing of Texas Onions. MP-395. College Station,
Tex., Texas Agr. Expt. Sta., 1959.
- Seelig, R.A.
Fresh Fruit and Vegetable Facts and Pointers - Dry Onions.
Wash., D.C., United Fresh Fruit and Vegetable Assn.,
1970.

Williams, Larry G., and DeLance F. Franklin
Bulk Harvesting, Handling, and Storing Yellow Sweet Spanish
Onions. Bull. 526., Moscow, Idaho, University of Idaho,
Idaho Agr. Expt. Sta., 1971.

U.S. Bureau of the Census
Census of Agriculture, Volume II., General Report, Chapter 6,
Crops, Nursery and Greenhouse Products, Forest Prod-
ucts. Issues 1940 through 1969.

U.S. Department of Agriculture, Agricultural Marketing Service
Fresh Fruit and Vegetable Shipment Totals by Commodities,
States, and Months. Annual Reports, 1972-76.

Fresh Fruit and Vegetable Unload Totals in 41 Cities.
Annual Reports, 1972-76.

Fresh Fruit and Vegetable Unloads. Issues for Eastern,
Midwestern, Southern, and Western Cities by Commodi-
ties, States, and Months. Annual Reports, 1972-76.

Summary of Wholesale Prices of Fresh Fruit and Vegeta-
bles in New York City and Chicago and F.O.B. Shipping
Point Prices at Leading Shipping Points. Annual Reports,
1972-76.

, Economics, Statistics & Cooperatives Service
Vegetables for Fresh Market, Estimates by Seasonal Groups
and States. Various issues, 1964-77.

Structure of Seasonal Supply and Demand in The Onion
Market. Marketing Research Report No. 895, 1973.

, Food Safety and Quality Service
United States Standards for Grade of Onions (Other Than
Bermuda-Granex-Grano and Creole Types), 1971.

United States Standards for Grades of Bermuda-Granex-
Grano Types Onions, 1962.

United States Standards for Grades of Creole Onions,
1943.

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